

# Preface

Experimental protocols for and studies of the  
effects of surface passivation and water isotopes  
on the gliding speed of microtubules propelled  
by kinesin-1

By

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# Preface

Experiments require certain tools in order for them to work. These tools can be chemicals, proteins, equipment, and/or procedures. Chemicals and proteins can easily be thought of as tools since they are nothing more than the ingredients for an experiment, much like flour and eggs are ingredients for a cake. I believe that equipment are tools just like chemicals and proteins. It does not matter if the equipment is an oven to bake a cake in or, a 2 W infrared laser used in an optical tweezers: they are both things used to make something.

My definition of a tool can even be extended to include procedures. In science, much like in baking, we can follow recipes to produce either proteins or the carrot cake found in Figure 1. The end product of the baking or procedure to produce a protein is what I consider to be the platform where scientists or bakers can begin to become creative. As popular TV chefs of this era who decorate cakes will understand, the cake can be thought of as the tool or



**Figure 1:** Image of the birthday cake my wife made me for my 30<sup>th</sup> birthday.

rather, a vehicle, for creative arts. I should state, however, that I'm not belittling the mastery of baking because it is tough and not everyone can follow a recipe properly. Just like the preparation of a cake can be the platform for an artist to create a piece of art, so too is the preparation of an experiment the platform for a scientist to be creative while investigating nature.

I feel that the preparation of experiments in a reproducible manner should be paramount to experimentalists. Paying close attention to the design and preparation of an experiment allows the researcher to prepare the tools consistently. If the tools are produced the same every time, then the scientist has the leisure of not having to worry about an outcome changing simply because the time of day changes or other black box scenarios. The same thing applies to the baker, without the consistency of the cake recipe and ingredients, customers are not guaranteed a tasty cake on Wednesday as opposed to Thursday. Careful planning of experiments is good, however, sometimes the sweet success of doing something aspartame-esque in the lab is also a good thing. So, my stringent belief that experiments should be conducted in a precise manner does not hold all the time. However, for the gliding motility assay discussed in this dissertation to work properly, I have found it necessary to acquire a certain level of strictness in its preparation.

This thesis is written in a very conversational tone. I feel that being able to express highly technical details in a colloquial manner aids the reader in understanding what I have done and how I prepared things for the experiments. I encourage the reader to not dismiss the science that is being conducted in the thesis due to the tone of the writing.